Microbes Follow Humboldt: Temperature Drives Plant and Soil Microbial Diversity Patterns from the Amazon to the Andes

MICROBES FOLLOW HUMBOLDT: TEMPERATURE DRIVES PLANT AND SOIL MICROBIAL DIVERSITY PATTERNS FROM THE AMAZON TO THE ANDES

Andrew T. Nottingham, Noah Fierer, Benjamin L. Turner, Jeanette Whitaker, Nick J. Ostle, Niall P. McNamara, Richard D. Bardgett, Jonathan W. Leff, Norma Salinas, Miles Silman, Loeske E. G. Kruuk, and Patrick Meir

Study Description

More than 200 years ago, Alexander von Humboldt reported that tropical plant species richness decreased with increasing elevation and decreasing temperature. However, evidence for similar biogeographic patterns for plant, bacterial, and fungal communities together has remained elusive. Using an Andes-to-Amazon study transect traversing 3.5 km in elevation, we provide evidence demonstrating co-ordinated temperature-driven patterns in the diversity and distribution of all three major biotic groups in tropical ecosystems: soil bacteria, fungi, and plants.

Nottingham, A. T., N. Fierer, B. L. Turner, J. Whitaker, N. J. Ostle, N. P. McNamara, R. D. Bardgett, J. W. Leff, N. Salinas, M. Silman, L. E. G. Kruuk, and P. Meir. 2019. Microbes Follow Humboldt: Temperature Drives Plant and Soil Microbial Diversity Patterns from the Amazon to the Andes. Bull Ecol Soc Am 100(1):e01452. https://doi.org/10.1002/bes2.1452

Photo 1. The Kosñipata Valley, Peru. By studying this Andes-to-Amazon transect traversing 3.5 km in elevation, we provide evidence of co-ordinated temperature-driven patterns in the diversity and distribution of all three major biotic groups in tropical ecosystems: soil bacteria, fungi, and plants. (Photo credit: A. Nottingham)

Photo 2. Sunrise and soil samples at the Tres Cruces site (3,600 m asl) in Puna grassland, situated at the top of the 3.5 km elevation gradient from the Andes to the Amazon in Peru. (Photo credit: P. Meir)

Photo 3. Soil profile in lowland tropical forest (site TAM-05 at 210 m asl; left) and in upper montane forest (site TRU-02 at 3,200 m asl; right) situated along the 3.5 km elevation gradient from the Andes to the Amazon in Peru. (Photo credit: A. Nottingham)

These photographs illustrate the article "Microbes follow Humboldt: temperature drives plant and soil microbial diversity patterns from the Amazon to the Andes" by Andrew T. Nottingham, Noah Fierer, Benjamin L. Turner, Jeanette Whitaker, Nick J. Ostle, Niall P. McNamara, Richard D. Bardgett, Jonathan W. Leff, Norma Salinas, Miles Silman, Loeske E. B. Kruuk, and Patrick Meir published in *Ecology*. https://doi.org/10.1002/ecy.2482